

THE SATISFACTION AND PRECISION COMPARISON between manual and shifter instrument



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1 BACKGROUND

20-degree shifted angulation was recommended for reveal a superimposed canal of upper premolars. However, unacceptable quality from manual horizontal shifted angulation (MHSA) is often detected clinically and could be improved with shifter instruments in vitro.

2 OBJECTIVE

To investigate the satisfaction and precision between MHSA and 20-degree shifter instruments (20-SHIFTER) among Clinical dental students and experienced dental personnel.

Keywords: Endodontics treatment, Radiograph, Root morphology, Tube shift technique.

3 MATERIALS AND METHODS

The 125 clinical students and 23 experiences responded to the 5-rater questionnaire (IOC =0.8-1.0 in this study). An Endodontist and a Radiologist rated subjective quality rating of radiograph in film quality with 3 raters (Excellent, Diagnostic acceptable and unacceptable). Both Descriptive and Inferential statistics were used to evaluate satisfaction, maneuverability, repeatability, and reproducibility of both MHSA and 20-SHIFTER ($p < 0.05$) by SPSS version 17; Inc., Chicago, Illinois.

4 DATA ANALYSIS

1 Descriptive statistic

Mean

S.D.

Percentage

WILCOXON SIGNED RANKS TEST
MANN-WHITNEY U TEST

2 INFERENCE STATISTIC

NORMALITY TEST

- KOLMOGOROV-SMIRNOV TEST
- SHAPIRO-WILK TEST

3 PAIR T-TEST
INDEPENDENT T-TEST

Cohen's Kappa
(Subjective quality rating of radiograph)

OVERALL SATISFACTION

Table 1: Overall satisfaction

Questions	Dental student	Experience group	P_p
Instrument			
2.1 Use friendly manual	4.19(0.76)	4.13(0.81)	0.92
2.2 Easy to follow instruction	4.18(0.74)	4.17(0.83)	0.80
2.3 Size of 20-SHIFTER	4.25(0.75)	3.87(0.87)	0.32
2.4 Weight of instrument	4.28(0.86)	4.00(1.00)	0.35
2.5 Compatibility with XCP Rinn (Dentsply Rinn PA, USA)	3.54(1.00)	3.74(0.91)	0.20
2.6 Product design	4.18(0.83)	3.91(1.08)	0.69

Radiographic quality	Manual	20-SHIFTER	P_r	Manual	20-SHIFTER	P_r
2.7 Repeatability of B-L separation	2.76(1.14)	4.25(0.80)	0.00*	3.48(1.04)	4.26(1.01)	0.01*
2.8 Reproducibility of each canal in the same position from 1° and 2° time (B1-B2 and L1-L2)	2.82(1.11)	4.31(0.81)	0.00*	3.65(1.03)	4.30(0.97)	0.02*
2.9 Film fault and artifact	2.52(1.19)	3.90(1.29)	0.00*	3.70(0.93)	4.17(0.83)	0.06

* Statistically significant difference ($P < 0.05$) P_p : P-value of comparison between dental student and experience group

* 5-score rating satisfaction (Best, 1981)

THE COMPARISON BETWEEN DENTAL STUDENTS AND EXPERTS IN EACH TECHNIQUE

Table 2: The comparison between Dental students and Experts in each technique

N = 23	Repeatability					
	Manual			20-SHIFTER		
	Dental student Mean (S.D.)	Expert Mean (S.D.)	P_p	Dental student Mean (S.D.)	Expert Mean (S.D.)	P_p
Distance (mm) (B-L)	2.18 (0.36)	1.98 (0.35)	0.078	2.33 (0.19)	2.33 (0.24)	0.992
Satisfaction	3.74 (1.36)	4.04 (0.93)	0.003*	4.24 (0.67)	4.09 (0.98)	0.890
Maneuverability	3.43 (1.06)	4.09 (0.95)	0.037*	3.59 (0.82)	3.59 (1.00)	0.947
Time (sec)	21.72 (15.53)	20.27 (11.14)	0.818	31.39 (13.87)	28.86 (13.91)	0.258

5 RESULTS

Both groups gave a "Satisfy" (score range of 3.50-4.49) with the instrument and radiographic quality of the 20-SHIFTER. Besides, there was significantly higher radiographic quality satisfaction when compared with manual technique in both groups ($P < 0.05$). The separation of B-L root distance by a shifter in both groups of subjects was similar ($P > 0.05$) but both have a significantly better separation when using the instrument compared with a manual ($P < 0.05$). After the superimposition of the film, the reproducibility of the Buccal and lingual root positions were not significantly different ($P > 0.05$). The 20-SHIFTER could help reduce artifacts including Cone-cut (41.6% to 23.2%) and Unseparated canals 13.6% to none. Both expert radiologists and endodontists had a substantial agreement for the higher film quality by shifter (82.4 VS 86.5 %) to Manual (30.4 VS 25.0%)

6 CONCLUSION

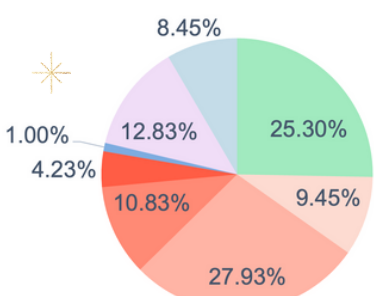
The 20-SHIFTER could help in increasing the diagnostic quality of superimposed canal premolar independent of experiences

7 CLINICAL SIGNIFICANCE

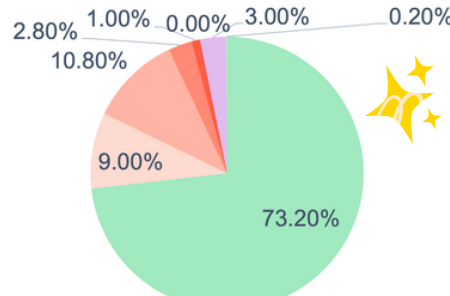
Shifter could help increase film quality in both Dental students and experienced dental personnel.

ARTIFACT IN DENTAL STUDENTS

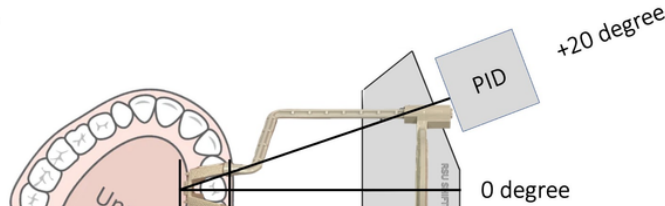
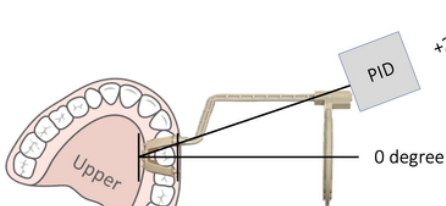
MANUAL HORIZONTAL SHIFTED ANGLATION



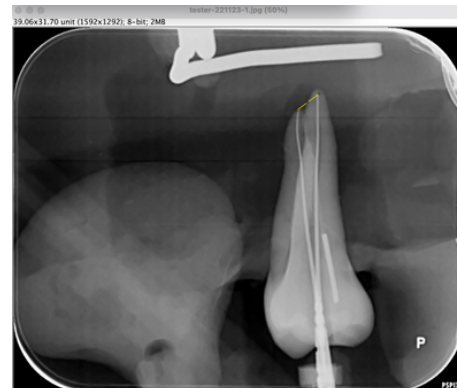
20 DEGREE SHIFTER INSTRUMENT



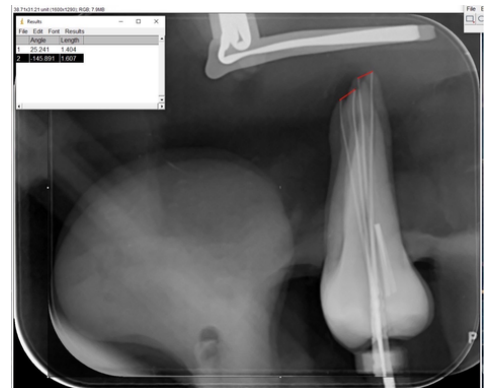
Legend for artifacts: No artifact, cone cut less than 1/4, cone cut 1/4, cone cut 1/2, cone cut more than 1/2, crown missing, No picture, Unseparated canal



20-DEGREE SHIFTED ANGLATION BY THE 20-SHIFTER.



THE REPEATABILITY BETWEEN B-L ROOT SEPARATION DISTANCE



THE REPRODUCIBILITY BETWEEN B-L ROOT SEPARATION DISTANCE